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EXAMINER	
BECKHARDT, LYNDSEY MARIE	

ART UNIT	PAPER NUMBER
1613	

NOTIFICATION DATE	DELIVERY MODE
05/18/2011	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/577,932	GAZZA, GIANLUCA	
	Examiner	Art Unit	
	LYNDSEY BECKHARDT	1613	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *26 April 2010*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-11,13-24,26-32 and 42* is/are pending in the application.

4a) Of the above claim(s) *8,10,17,27 and 32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-7, 9, 11, 13-16, 18-24, 26, 28-31 and 42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/19/2010*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claims 1-11, 13-24, 26-32 and 42 are currently pending. Claims 1-7, 9, 11, 13-16, 18-24, 26, 28-31 and 42 are currently under examination.

Information Disclosure Statement

Applicant's Informational Disclosure Statement, filed on 11/19/2010 has been considered. Please refer to Applicant's copy of the 1449 submitted herein.

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/26/2010 has been entered.

Examiner's Note

Unless otherwise indicated, previous objection/rejections that have been rendered moot in view of the amendment will not be reiterated. The arguments in the 04/26/2010 response will be addressed to the extent they apply to current rejection(s).

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

New Rejections:

The following rejections are newly applied.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 19 recites the limitation "drug eluting polymer". There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 103

Claims 1-4, 6, 9, 11, 13, 15-16, 18-19, 26, 31 and 42 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,335,029 (previously provided) in view of MDDI and Kaplan.

Determining the scope and contents of the prior art.

Regarding claim 1, the '029 patent teaches applying first to said device at least one layer of a drug (abstract); applying second to said device a polymer having active functional groups capable of chemically binding biological molecules, characterized in that said second applying step takes placed in single step by means of plasma methods (column 2, lines 51-60, column 7, lines 45-60), and depositing biological molecules on the surface of said polymer, said biological molecules having stable reactive functional groups (column 11, claim 10).

Regarding claim 2, the '029 patent teaches wherein the polymers are chosen from among polymers having amine groups, carboxyl groups and sulphydryl groups (column 11, claim 8).

Regarding claim 4, the ‘029 patent teaches said polymers having carboxylic groups are chosen from between acrylic acid and methacrylic acid (column 11, claim 8).

Regarding claim 9, the '029 patent teaches in which the precursor of said polymer is in the form of a gas (column 7, lines 43-50).

Regarding claim 11, the ‘029 patent teaches said polymer is applied in the form of a film with a thickness of between 0.01 to 10 microns (column 8, lines 57-60).

Regarding claim 13, the ‘029 patent teaches said drug is chosen from a group consisting of anti-inflammatory, anti-proliferative and anti-migratory drugs and immunosuppressive agents (column 6, lines 5-13, column 10, claim 3).

Regarding claims 15-16, the ‘029 patent teaches the drug is incorporated in said layer in a material capable of eluting said drug and said material is a second polymer selected form the group consisting of hydrophobic hydrocarbons wherein the hydrophobic hydrocarbons are chosen from among polystyrene, polyethylene, polybutadiene and isoprene (abstract, column 6, lines 40-45).

Regarding claim 18, the ’029 patent teaches said drug is applied by means of immersion in a suitable solution or deposited by spraying (column 5, lines 23-26).

Regarding claim 19, the ‘029 patent teaches said drug eluting polymer is deposited in the form of film with a thickness between 0.5 and 20 microns (column 5, lines 33-40).

Regarding claim 31, the ‘029 patent teaches application of further biodegradable polymer layers over said biological molecule layer (column 7, lines 33-44).

Regarding claim 42, the ‘029 patent teaches immersing said device including said polymer having said reactive functional groups in an aqueous bath containing at least one biological molecule (column 9, lines 35-47).

The ‘029 patent does not ipsis verbis teach cold plasma methods (claim 1).

The ‘029 patent does not ipsis verbis teach depositing the elected hyaluronic acid (claims 1 and 26).

The ‘029 patent does not ipsis verbis teach said polymers having amine groups are chosen form among allylamine, heptaylamine, alphatic amines and aromatic amines (claim 3).

The ‘029 patent does not teach cold plasma methods comprise cold plasma produced under vacuum using discontinuous or continuous technology (claim 6).

The ‘029 patent does not ipsis verbis teach immersing said device including said polymer having reactive functional groups in a bath containing at least one biological molecule so as the chemically bind said biological molecule to said functional groups (claim 42).

Regarding claim 1, Kaplan teaches cold plasma methods (page 2, last paragraph).

Regarding claim 3, Kaplan teaches said polymers having amine groups are chosen form among allylamine, heptaylamine, alphatic amines and aromatic amines (page 5, first paragraph, page 8, third paragraph).

Regarding claim 6, Kaplan teaches methods comprise cold plasma produced under vacuum using discontinuous or continuous technology (page 8, last paragraph).

Neither the '029 patent nor Kaplan ipsis verbis teach depositing the elected hyaluronic acid (claims 1 and 26).

Neither the '029 patent nor Kaplan ipsis verbis teach immersing said device including said polymer having reactive functional groups in an aqueous bath containing at least one biological molecule so as the chemically bind said biological molecule to said functional groups (claim 42).

Regarding claims 1 and 26, MDDI teaches hyaluronic acid (page 9, third and fourth paragraph).

Regarding claim 42, MDDI teaches chemically binding said biological molecule to said functional groups (page 9, third and fourth paragraph) and hyaluronic acid in water (page 5, third paragraph, page 2, last paragraph).

Ascertaining the differences between the prior art and the claims at issue, and Resolving the level of ordinary skill in the pertinent art.

People of the ordinary skill in the art will be highly educated individuals such as medical doctors, scientists, or engineers possessing advanced degrees, including M.D.'s and Ph.D.'s. Thus, these people most likely will be knowledgeable and well-read in the relevant literature and have the practical experience in method of coating medical

devices and cold plasma deposition. Therefore, the level of ordinary skill in this art is high.

"A person of ordinary skill in the art is also a person of ordinary creativity, not an automaton." *KSR International Co. v. Teleflex Inc.*, 550 U.S. ___, ___, 82 USPQ2d 1385, 1397 (2007). "[I]n many cases a person of ordinary skill will be able to fit the teachings of multiple patents together like pieces of a puzzle." *Id.* Office personnel may also take into account "the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* at ___, 82 USPQ2d at 1396.

Considering objective evidence present in the application indicating obviousness or nonobviousness.

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use cold plasma methods for applying the functional group containing polymer taught by the '029 patent because Kaplan teaches plasma induced grafting offers another method of proving reactive sites to normally inert polymer (page 8, third paragraph) and are an efficient and reliable means of altering surface properties of all materials without affecting the bulk properties of the treated material (page 9, second paragraph).

It would have been obvious to one of ordinary skill in the art to substitute a plasma deposited polymer taught by the '029 patent (column 7, lines 55-60) with a second plasma deposited polymer, i.e. allyamine, taught by Kaplan (page 8, third paragraph) with a reasonable expectation of success because the simple substitution of one known element for another would have yielded predictable results to one of

ordinary skill in the art at the time of the invention. M.P.E.P. §2144.07 states "The selection of a known material based on its suitability for its intended use supported a *prima facie* obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945)." When substituting equivalents known in the prior art for the same purpose, an express suggestion to substitute one equivalent component or process for another is not necessary to render such substitution obvious. *In re Fout*, 675 F.2d 297, 213 USPQ 532 (CCPA 1982). M.P.E.P. §2144.06. One of skill in the art would have an expectation of success substituting plasma deposited polymers taught by the '029 patent, such as acrylic acid (column 7, lines 55-60) with allyl amine taught by Kaplan (page 8, third paragraph) because Kaplan teaches typical monomers that can be used in acrylic acid, allyl amine and allyl alcohol (page 5, first paragraph).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to attach hyaluronic acid to the barrier layer polymer taught by the '029 patent (column 9, lines 33-45, column 11, claim 10) because MDDI teaches hyaluronan coating to be used on medical device to improve biocompatibility and lubricity and reduce fouling and tissue abrasion (page 4 fifth paragraph). One of ordinary skill in the art at the time the invention was made would have a reasonable expectation of success because the '029 patent teaches covalent attachment of appropriate drugs to functional groups of the plasma deposited polymer (column 7, lines 55-65), Kaplan teaches allyl amine used for plasma deposition which results in amine functionality (page 8, fourth paragraph) and MDDI teaches immobilization heparin and hyaluronate through carbodimmide chemistry to primary amine groups (page 9, fourth

and fifth paragraph). One of ordinary skill in the art would have a reasonable expectation of success as the '029 specifically teaches use of heparin applied to the plasma deposited layer (column 11, claim 10) and MDDI teaches heparin and hyaluronic acid are both glycosaminoglycans (page 2, third paragraph).

The cited prior art meets the criteria set forth in both *Graham* and *KSR*, and the teachings of the cited prior art provide the requisite teachings and motivations with a clear, reasonable expectation of success. Thus, absent evidence to the contrary, the invention as a whole is *prima facie* obvious.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,335,029 in view of MDDI and Kaplan as applied to claims 1-4, 6, 9, 11, 13, 15-16, 18-19, 31 and 42 above, and further in view of US 4,720,512 (previously applied).

As mentioned in the above 103(a) rejection, all the limitations of claims 1-4, 9, 11, 13, 15-16, 18-19, 31 and 42 are taught by the combination of the '029 patent, MDDI and Kaplan.

The combination of references does not teach the cold plasma under vacuum at a pressure of 0.01 and 10 mbar at 1 to 500 W and for not more than 30 minutes.

Regarding claim 7, the '512 patent teaches where the cold plasma vacuum pressure is between 0.01 and 10 mbar, at a power between 1 and 500 W and for a period of time of not more than 30 minutes (column 4, lines 43-56). The 0.1 to 5 torrs taught by the '512 publication is equivalent to 0.133 to 6.66 mbar, which falls within the range required by the instant claims.

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use the cold plasma treatment conditions as taught by the '512 patent to deposit the allyl amine to the substrate surface to which hyaluronic acid can bind as taught by the combination of the '029 patent, Kaplan and MDDI because the cold plasma deposition method is well known in the art and used to apply functional groups to a polymer to which sulfated polysaccharides can bind as taught by the '512 patent.

Claims 14 and 20-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,335,029 in view of MDDI and Kaplan as applied to claims 1-4, 6, 9, 11, 13, 15-16, 18-19, 31 and 42 above, and further in view of WO 99/03854 (previously applied).

As mentioned in the above 103(a) rejection, all the limitations of claims 1-4, 9, 11, 13, 15-16, 18-19, 31 and 42 are taught by the combination of the '029 patent, MDDI and Kaplan.

The combination of references does not teach the drug found in claim 14, wherein the drug is present in quantities of 0.001 mg and 10 mg.

The '854 publication teaches that 4-[(4-methyl-1-piperazinyl)methyl]-N-[4-methyl-3-[[4-(3-pyridinyl)-2-pyrimidinyl]animo]-phenyl] benzamide methane sulphonate is effective in diseases associated with vascular smooth-muscle migration and proliferation, such as restenosis and atherosclerosis (pg 12, lines 25-27). As such 4-[(4-methyl-1-piperazinyl)methyl]-N-[4-methyl-3-[[4-(3-pyridinyl)-2-pyrimidinyl]animo]-phenyl] benzamide methane sulphonate can thus inhibit proliferation and especially the

migration of vascular smooth-muscle cells (pg 16, lines 1-3). Doses are taught between about 1 and 500 mg (page 17, first paragraph).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use the drug taught by the '854 publication, 4-[(4-methyl-1-piperazinyl)methyl]-N-[4-methyl-3-[[4-(3-pyridinyl)-2-pyrimidinyl]animo]-phenyl] benzamide methane sulphonate (page 12, lines 25-27) on the medical device taught by the '029 publication, Kaplan and MDDI because the '029 publication teaches use of an anti-proliferative active agent (column 6, lines 5-27) and the '854 publication teaches the active agent is effective agents vascular smooth muscle migration and proliferation (page 12, lines 25-27).

Regarding claims 14 and 20-24, the limitation wherein the drug is an anti-inflammatory, and anti-proliferative, and anti-migratory and an immunosuppressant is met by 4-[(4-methyl-1-piperazinyl)methyl]-N-[4-methyl-3-[[4-(3-pyridinyl)-2-pyrimidinyl]animo]-phenyl] benzamide methane sulphonate taught by the '854 publication. Applicant, in electing the above mentioned drug, indicated that it read on claims 20-24, therefore the elected drug would include the anti-inflammatory, and anti-proliferative, and anti-migratory and immunosuppressant properties.

Regarding the limitation where in 0.01 mg to 10 mg of the drug are present per device the '854 publication teaches doses of the active agent are from 1 to 500 mg (page 17, first paragraph). As MPEP 2144.05 recites "where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine optimization".

Claims 29-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,335,029 in view of MDDI and Kaplan as applied to claims 1-4, 6, 9, 11, 13, 15-16, 18-19, 31 and 42 above, and further in view of US 6,287,285 (previously applied).

As mentioned in the above 103(a) rejection, all the limitations of claims 1-4, 9, 11, 13, 15-16, 18-19, 31 and 42 are taught by the combination of the '029 patent, MDDI and Kaplan.

The combination of references does not teach a preliminary step of cleaning/washing the medical device (claim 29).

The combination of references does not teach said cleaning/washing step is followed by a step of pretreatment of said medical device to promote adhesion of the drug incorporated where appropriate in an eluting polymer to this device (claim 30).

The '285 patent teaches the coating on the medical device generally includes a base coat and a top coat. The base coat has binding component and is used to strongly adhere to the surface of the device (column 2, line 12-18). In the presently preferred embodiments, the device is a polymeric catheter, or a metal guidewire coating with a primer or without a primer, having a hydrophilic coating (column 13, lines 24-30). The surface of the device is generally cleaned before coating with the primer or the hydrophilic coating solutions (column 13, lines 33-36).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to clean the medical device and apply a primer coating to

a medical device as taught by the '285 patent before the addition of the drug eluting polymer, plasma treatment and hyaluronic acid coatings as taught by the combination of the '029 patent, Kaplan and MDDI because it is well known in the art to clean a device for implantation before coating and the addition of the primer coating helps the coating adhere strongly to the medical device as taught by the '285 patent (column 13, lines 24-36).

Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,335,029 in view of MDDI and Kaplan as applied to claims 1-4, 6, 9, 11, 13, 15-16, 18-19, 31 and 42 above, and further in view of Tsai (previously applied).

As mentioned in the above 103(a) rejection, all the limitations of claims 1-4, 9, 11, 13, 15-16, 18-19, 31 and 42 are taught by the combination of the '029 patent, MDDI and Kaplan.

The combination of references does not teach the precursor of said polymer having sulphhydryl groups which are chosen from volatile mercaptans.

Tsai teaches application of RF (radio frequency) cold plasma method to the decomposition of methanethiol (methyl mercaptan, CH_3SH) at various input powers (20-90 W) (abstract). Recently, trends toward a higher quality, finer patterning and insulating ability in thin films have let to the application of radio-frequency (RF) plasma technologies (page 2384, second column, second paragraph).

It would have been prima facie obvious to one of ordinary skill in the art at the time the invention was made to use methyl mercaptan as the cold plasma deposited layer as taught by Tsai for the cold plasma deposited layer taught by the combination of

the ‘029 patent, Kaplan and MDDI because use of the methyl mercaptan would leave a free reactive group as is a well known plasma treatment starting material to those of ordinary skill in the art.

Claim 26 is rejected under 35 U.S.C. 103(a) as being unpatentable over US 6,335,029 in view of MDDI and Kaplan as applied to claims 1-4, 6, 9, 11, 13, 15-16, 18-19, 31 and 42 above, and further in view of US 4,801,475.

As mentioned in the above 103(a) rejection, all the limitations of claims 1-4, 9, 11, 13, 15-16, 18-19, 31 and 42 are taught by the combination of the ‘029 patent, MDDI and Kaplan.

Regarding claim 26, the ‘029 patent teaches said biological molecules are deposed by immersing the medical device (column 9, lines 35-47).

The combination of references does not teach an aqueous solution containing said biological molecules in a concentration of 0.01% to 1% by weight (claim 28).

Regarding claim 26, the ‘475 patent teaches a 0.5% aqueous solution of sodium hyaluronate applied as a coating (column 10, claim 3).

It would have been prima facie obvious to one of skill in the art at the time the invention was made to use the solution taught by the ‘475 patent because the combination of the '029 patent, Kaplan and MDDI teach application of hyaluronic acid by dip coating the device in a solution and the '475 patent teaches aqueous solutions at a known concentration used for coating application (column 10, claim 3).

Conclusion

No claims are allowed.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LYNDSEY BECKHARDT whose telephone number is (571)270-7676. The examiner can normally be reached on Monday thru Thursday 7:00 am to 4:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Kwon can be reached on (571) 272-0581. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/LYNDSEY BECKHARDT/
Examiner, Art Unit 1613

/Kevin K. Hill/
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